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ABSTRACT

The expanded socio-psychophysiological model (SPPM) appears to provide a meaningful paradigm for explaining the psycho-psysiological effects of Social Reinforcement Systems (SRS). This model may be used to assist individuals, and the society, to become more aware of the effects that social practices have on the immediate and long-term actions of others. A social reinforcement system is operationally defined as those sociological forces, positive or negative, which influence the sociability of an individual by causing him to establish a systematic network of possible alternatives to a given social stimulus such that he may continually perceive his actions as positive reinforcements which maintain his internal security or stability. The socio-psychophysiological model is an extension of the stimulus-reaction mechanism where the multiple effect of SRS acts as the vehicle through which social behavior is conditioned. Neuro- and psycho-physiological factors are expressed as components in the internal status mechanism of the SPPM. (JM)

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A SOCIO-PSYCHOPHYSIOLOGICAL MODEL FOR EXPLAINING THE CAUSAL EFFECTS OF SOCIAL REINFORCEMENT SYSTEMS

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A SOCIO-PSYCHOPHYSIOLOGICAL MODEL FOR EXPLAINING THE CAUSAL EFFECTS OF SOCIAL REINFORCEMENT SYSTEMS

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The overt behavior of the human organism has always been of interest to scientists who study the interactions of man with his environment and society. Philosophers conceptualized these interactions as internalized faculties--e.g., reason (Locke, 1952), morals (Hume, 1952), ethics (Spinoza, 1952). Psychologists have developed quantitative and conceptual indices which characterize man's behavior in terms of consequential experiences. Freudian psychologists have used dreams and other subconscious revelations to formulate a system for explaining the actions of man. Contemporaneous with the Freudian theory are behavioristic postulates which describe man's behaviors in terms of stress, physiological needs (Guthrie), conditioned responses (Thorndike), and drive reduction (Hull). Most recently, a theory of behavior shaping through scheduled reinforcements have been hypothesized (Skinner, 1948; 1963). Cognitive psychologists--e.g., Kohler, Koffka, Levin, Bruner, Piaget--have developed theories which postulate the thinking (cognitive processes) of man.

PROBLEM

The theories cited have provided essential information about the consequences of man's interaction with his society; however, they are characterized by specific conditions and, therefore, are not easily

translated into a general system for describing social behavior or the signs and subtle causative factors which precipitate aberrant social behavior.

Hypothesis

A more generalized system for explaining social behavior seems plausible when one considers such behaviors as reflections of a social reinforcement systems (SRS). An srs is operationally defined as those sociological forces, positive or negative, which influence the sociability of an individual by causing him to establish a systematic network of possible alternatives to a given social stimulus such that he may continually perceive his actions as positive reinforcements which maintain his internal security or stability.

SOCIAL REINFORCEMENT SYSTEMS (SRS)

This operational definition appears to be consistent with Mead's (1968) conceptualization of social evolution:

"From the standpoint of social evolution, it is the bringing of any given social act, or of the total process in which that act is a constituent, directly as an organized whole into the experience of the individual organisms implicated in that act...[such that] he may consequently regulate and govern this individual conduct...[subsequent to] the [constituted] value and significance of self-consciousness in those individual organisms" (Cited by Buckley, 1968, p. 512).

However, Nett (1968) concluded that one reason why social control theory analysis of rational or strategic control has so frequently been

deterred is that rational behavior, if it occurs, of necessity has to occur not only as deviant behavior, but deviant behavior of a type which is usually too complex for easy generalization. He indicated that non-pathological and sociological causes which fall outside of any area of degeneracy may be reduced to a number of discernible factors which by contrast vitally affect social control (i.e., minority attachments, marginality of the group, specific ambiguities in the culture, imagination, intelligence, moral equivocation, p. 411). These factors (variables) represent conditions [+srs or -srs] to which individuals so affected must make additional adjustments.

Such diacritical signs, according to Nadel's (1968) description, "...are multivalent to a simple degree and will often indicate a person's social status, group or class membership, and generally his social relationship with others. Therefore, the continuance of these indicative modes of behaviour is reinforced by the importance of the state of affairs they indicate...[and] individuals [retain] behaviours in order to evince their status and group membership and, implicitly, to qualify for the benefits that go with them" (p. 403). Advocating the use of feedback systems, he concluded that when the whole society is taken to be the relevant system, any "output" of the intended kind--any conduct in accordance with social norms--is partly returned as "inputs"--information sustaining further action of that character. Therefore, if the efficacy of values (linked incentives) corresponds to "positive feedback [+srs]," the other types of self-regulation (multiple consequences) correspond to "negative feedback [-srs]," controlling output through signal errors--errors being

forms of deviant conduct whose penalizing consequences force action back into intended channels (p. 407).

Buckley (1968) also concluded that sociocultural processes of control can be explained through the basic cybernetic principles of information flow among feedback loops. He indicated that stability and change within the system are a function of the same set of variables [SRS] which must include both the internal state of the system and the state of its significant environment, along with the nature of the interchange between the two (p. 510). In this system, envisioned as a sociocultural system of constrained interactions among behavioral systems, true feedback control loops make possible not only self-regulation, but also self-direction or at least adaptation to a changing environment, such that the system can change or elaborate its structure as a condition of survival or viability (p. 490). Moreover, this theory includes deviation and conformity patterns as do the others; however, these structuring patterns are relative to the reference selected by the observer[1] (p. 510).

The use of cybernetic principles and feedback loops as preferred methods for explaining social behavior suggests that most sociological responses are not static, predictable outcomes, but rather a complex, amorphous situation where self-regulatory mechanisms and desires to maintain the integrity of one's individual values are paramount. It would appear then (1) that the manner in which social actions are perceived, instituted, or regulated establishes a network of psychological mechanisms which become somewhat standardized for an individual or group of individuals, such that the kinds of reinforcements--+srs or -srs--

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[1] Emphasis added by author.

he received from the society are indications of his social acceptance and indications of how important his values are to that society, and (2) that more information is needed about the immediate and long-term effects of SRS on the social and psychological behavior of man. But, where can one find supportive information that would assist him in this task?

PSYCHOPHYSIOLOGICAL FINDINGS

Recent neuro- and psychophysiological investigations seem to have provided information which could serve to formulate psychophysiological correlates of a Social Reinforcement System. The study of von Foester (1968), as well as the propositional calculus of McCulloch and Pitts (1968), attempting to replicate the process of perceptual encoding, indicated that there are cerebral mechanisms which control the formation of stimulus patterns. This controlling mechanism alters the number of stimuli reaching the higher brain centers by delaying (inhibition) or facilitating (excitation) the transmission of nerve impulses. It is this modulation or regulation of neuronal impulses which produces the sensory information that creates the emerging integrated information image to which responses are made.

It appears that under normal socio-psychological conditions, one perceives his environment or society in a somewhat consistent manner. However, studies of the effects of stress on the psychological and physiological reactions of man revealed that, under stress or adverse conditions, specific brain cells produce chemicals which alter the composition of the fluid in the synaptic sacs such that impulses are "shorted

out" or delayed. The net effect of these activities is to produce generalized inhibitions or distortions of the initial encoded message (Luria, 1966; Beritashvili, 1969).

Oken (1967), reporting on the psychophysiological and psychoendocrinological effects of stress and emotion, indicated (1) that decreases in the level of certain steroids (i.e., hydroxycorticosteroids) produce inhibitory effects on the mesencephalic tegmentation and (2) that the cerebral cortex exerts a tonic inhibitory influence on ACTH through this mechanism. These and other findings provided additional data which supported Pribram's hypothesis that electrical activity occurring in the amygdala is associated with events that produce reward and punishment (pp. 44-50).

Fatigue, hypoxia, acidosis, and insulin hypoglycemia are agents, identified by Cohen (1967), that have the capacity to decrease cortical dominance over subcortical centers (p. 108). Cohen also reported, in his study of the central nervous system's functions in altered sensory environments, (1) that perceptual mode differences may reflect (in some persons) CNS differences (p. 93); (2) that Bridger's speculation --that the state (neocortical inhibition) is associated with interference in reality testing between symbol and object (internal and external referents)--seemed probable (p. 106); (3) that in the development of socio-psychological theories the subject's knowledge of expected reactions, his motivation to experience and report,...and his self-suggestive effects should be included as influential variables of a person's behavior (p. 107); and (4) that his CNS conceptual model assumes that integrative

processes consist of interactions among various inhibitory and excitory inputs coming from a variety of areas of the nervous system, peripheral effects and/or changes in internal chemical environment (p. 108).

Summarizing the studies on psychophysiological responses to military stress, Weybrew (1967) reported that his findings and others suggest that personality factors, in particular those related to the experience history of the person, may be meaningfully related to indices of autonomic and endocrine functions. He concluded that these covariances in turn may account for a sizable portion of the individual differences reported in most stress studies (p. 346).

From these findings, it would appear that the human organism has a number of psychophysiological mechanisms which operate during periods of stress and/or anxiety. Weybrew (1967) reported from his studies that harm-anxiety in the main account for acute endocrine and psychophysiological changes and that shame-anxiety may account for some of the more subtle but often chronic effects of stress (p. 345).

In conjunction with the information gathered concerning SRS, it appears that patterns of social behavior are a reflection of immediate and prolonged social reinforcements which become imbeded in a network of psychophysiological mechanisms. Therefore, social reinforcement patterns would be more predictive of an individual's behavior because they initiate plausible psychophysiological alternatives within the individual. The overt response(s) or action(s) which arise from these interactions would be a function of one's internal status, which is characterized by his social interactions--particularly those which have proved to stabilize his internal integrity and values.

A SOCIO-SYCHOPHYSIOLOGICAL MODEL (SPPM)

A Socio-psychophysiological Model (SPPM) has been proposed which attempts to demonstrate the relationships between psychophysiological mechanisms and SRS. The purpose of this model is to explain how SRS (inputs) affect the shaping of the final behavior (outputs) of the individual and to postulate how these reinforcements establish physiological mechanisms which tend to maintain the internal security of the individual by causing him to respond in a manner which is most rewarding to him and maintains his internal integrity and security. (See Figure 1)

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Insert Figure 1 about here

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The traditional S-R loop, with accompanying inputs from the internal psychological and physiological components, is shown by the double lines. Responses emanating from this causal relationship, described earlier by behavioristic psychologists, result from previously learned conditions which have been "fixed" through frequency of use or a reinforcement policy.

The SPPM is presented as an extension of the S-R mechanism where the multiple effect of SRS is shown as the vehicle through which social behavior is conditioned. The cited neuro- and psychophysiological findings are expressed as components in the internal status mechanism of the SPPM (viz., pseudostatic and flexible status factors). SPS provide three major inputs. One input interacts directly with responses; the other two inputs stimulate the internal status variables. In addition, SRS

initiate cues which become associated with the activities of the flexible status variables.

It appears that the level of one's psychophysiological involvement with a stimulus object or situation is dependent upon the affected state of the internal status factors. Accordingly, the covert or overt social behavior of an individual is a reflection of the summative effectuation of these factors.

Internal Status Components

The internal status of the individual is maintained by a confunctional relationship between two status factors: pseudostatic (X) and flexible (Y). These status factors provide the individual with direct inputs from the outside world and indirect inputs through the SRS.

Pseudostatic (X) status factors. Pseudostatic status factors are those variables which remain fairly constant under most conditions and which after excitation return to a level of performance (existence) that is not too deviant from its original level. In instances where change occurs, that change exhibits a pseudopermanent or fairly predictable outcome. Examples of pseudostatic status factors are one's physiological condition, one's level of knowledge, one's social status with its accompanying cultural values.

Flexible (Y) status factors. Flexible status factors are those variables which are in a somewhat continuous flux. At any one instance, the level of these variables is a function of slight alterations in the pseudostatic factors or inputs from one's SRS. These variables (1) are unpredictable, (2) are easily modified, and (3) require a major effort to maintain a particular level of internal stability. Examples of these variables are one's attitudes, one's self-perception, and one's peer status.

Although these two types of status variables exist, there is probably not a one-on-one relationship between the members of each set. It is hypothesized that the mapping of the pseudostatic status factors on the flexible would constitute a one-on-many configuration. It is also believed that there are more flexible status variables than pseudostatic.

Proposed Mechanisms[†]

When an individual perceives stimuli, an immediate social anticipatory effect, +srs, is initiated. These anticipatory cues immediately alert the pseudostatic and flexible factors. Concurrently, a perceptual screening and discrimination process begins to operate (a) drawing information from pseudostatic variables and (b) associating connections with those flexible status variables which are being continually reinforced by the +srs. If the +srs remains, recognition and verification of the levels of internal involvement (and satisfaction) are accrued and the organism produces a response that would be consistent with the intended actions of the initiator or condition. Over time the individual would learn both directly and indirectly [be shaped] to respond appropriately to the kinds of social stimuli presented to him.

When confronted with an -srs, however, the organism is placed in a state of confusion because he would not be sure how to respond to the stimuli in such a way as to receive a +srs which would return his internal systems to a state of equilibrium. Therefore, an -srs places the internal status of the organism in an inhibitory state. In this condition, the organism produces chemicals which tend to change or distort the incom-

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[†] Specific physiological treatments are not discussed because of the length of the presentation.

ing stimuli in an attempt to gain time for a period of adjustment. Although the pseudostatic factors begin to function at higher levels to improve the organism's state of awareness, the confounding effects of the flexible status variables defeat the cause.

Since the incoming stimuli have been altered by the changing patterns of the perceptual impulses, inappropriate screening and low levels of discrimination occur, such that neither are the emerging messages recognized nor are the reciprocating (internal/external) referent images verified. The logical conclusion of the response is dependent upon which of the flexible status variables is most affected (activated) by the -srs. The individual races back through his past experiences and chooses that response which yielded a positive or rewarding condition for him. He then displays that behavior again in order to arrest the dilemma he is facing.

In this attempt, the response probably would not be consistent with the established social values or mores, but more related to the kinds of discernible factors or diacritical signs discussed earlier--subcultural patterns, peer standards, SRS levels, etc...

CONCLUSION

The Socio-psychophysiological Model, when expanded, appears to provide a meaningful paradigm for explaining the psychophysiological effects of Social Reinforcement Systems. It is hoped that this model can be used to assist individuals, and the society, to become more aware of the effects that social practices have on the immediate and long-term

actions of others. It is also hoped that the model will insure--in Nadel's (1968) words, "...[that better] guidance [be accomplished] through a system [whose] values and penalizations operate consistently [across all peoples to insure] and maintain social order" (p. 407).

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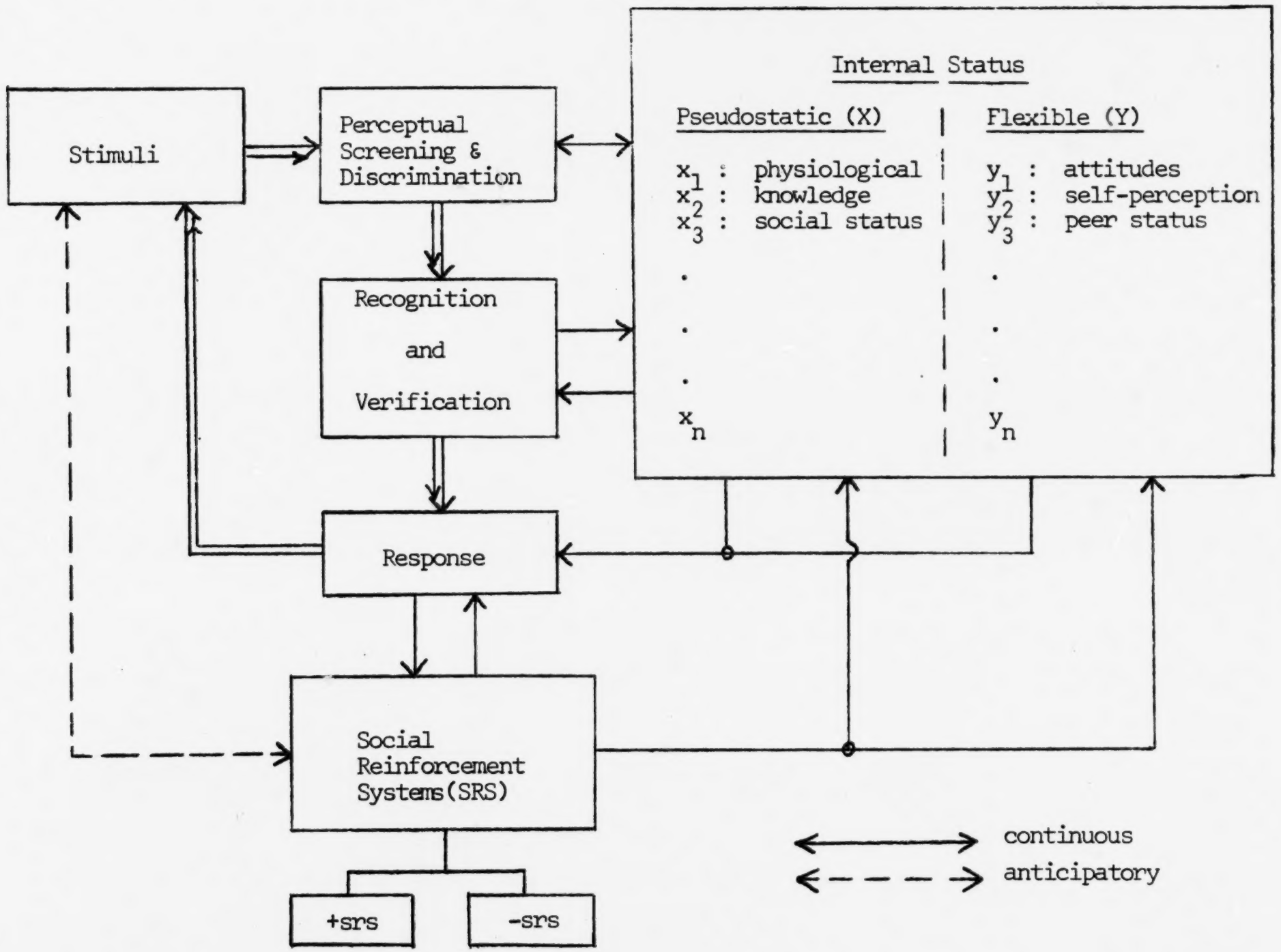
Figure 1

A Socio-psychophysiological Model
of Social Reinforcement Systems



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